CLAIMS

I claim:

1. A pressurized liquid dispensing system comprising:

a pressurized liquid source that is configured to deliver pressurized liquid at a first, relatively high line pressure;

a liquid dispenser that is located remote from said liquid source and that is configured to dispense liquid delivered thereto at a second, relatively low pressure;

a liquid line connecting said liquid source to said liquid dispenser; and

a pressure reducer device within said liquid line, said pressure reducer comprising a housing and a restrictor disposed within said housing, said housing having a first opening, a second opening, and at least one passage formed between said first and second openings, said restrictor being located in said passage and being configured to impart a series of directional changes to liquid flowing through said passage, thereby reducing the pressure of liquid flowing through said passage to at least approximately said second pressure.

2. A system as recited in claim 1, wherein said restrictor comprises a plurality of flow divider segments located in series within said passage.

3. A system as recited in claim 2, wherein each of said flow divider segments is configured to sequentially divide liquid flowing therepast into multiple liquid streams and to recombine said multiple liquid streams.

4. A system as recited in claim 3, wherein each of said flow divider segments comprises a generally helically curved blade having a leading edge, a trailing edge, and opposed curved surfaces, each of which is configured to border one of said liquid streams.

5. A system as recited in claim 4, wherein said curved blades are arranged end-to-end such that, with the exception of a last curved blade of said pressure reducer, the trailing edge of each curved blade extends at least generally perpendicularly to the leading edge of an adjacent downstream blade.

6. A liquid flow pressure reducer comprising:

(A) a housing having an inlet opening, an outlet opening, and at least one passage formed between said inlet opening and said outlet opening; and

(B) a restrictor formed from a plurality of flow divider segments located within said passage, each of said flow divider segments being configured to sequentially divide liquid flowing therepast into multiple liquid streams and to recombine said multiple liquid streams while causing the flowing liquid to change directions.

7. A pressure reducer as recited in claim 6, wherein said flow divider segments are arranged in a pattern such that said segments alternate between segments having a first directional curvature and segments having a second directional curvature.

8. A pressure reducer as recited in claim 7, wherein each of said segments comprises a generally helically curved blade having a leading edge, a trailing edge, and opposed curved surfaces, each of which is configured to border one of said liquid streams.

9. A pressure reducer as recited in claim 8, wherein said curved blades are arranged end-to-end such that, with the exception of a last curved blade of said pressure reducer, the trailing edge of each curved blade extends at least generally perpendicularly to the leading edge of an adjacent downstream blade.

10. A pressure reducer as recited in claim 6, further comprising a flow divider bar mounted on the leading edge of an upstream-most segment of said restrictor and a flow straightener mounted on the trailing edge of a downstream-most segment of said restrictor.

11. A pressure reducer as recited in claim 6, wherein said housing has a single passage.

12. A pressure reducer as recited in claim 6, wherein said housing has a plurality of passages, each of which houses a separate restrictor.

13. A pressure reducer as recited in claim 12, wherein a chamber is provided within said housing toward said outlet opening to allow liquid from each passage to recombine and help straighten flow before exiting said outlet opening.

14. A method comprising:

determining a pressure drop required in a liquid flow path to achieve a desired liquid pressure at an outlet of said flow path;

determining properties of a pressure reducer required to obtain said pressure drop; and

inserting a pressure reducer having said determined properties in said flow path.

15. A method as recited in claim 14, wherein the inserting step comprises inserting said pressure reducer in a liquid line of said flow path at a location remote from said outlet of said flow path.

16. A method as recited in claim 14, wherein the inserting step comprises inserting said pressure reducer into a tubing section and then coupling ends of said tubing section to adjacent sections of a liquid line of said flow path.

17. A method as recited in claim 14, wherein the inserting step comprises inserting said pressure reducer in a faucet having an outlet that forms an outlet path and that couples an inlet of said faucet to a liquid line of said flow path.

18. A method as recited in claim 14, wherein the step of determining properties comprises consulting tabulated data correlating pressure drop with flow reducer properties.

19. A method of reducing liquid pressure in a pressurized line, the method comprising:

directing liquid through said pressurized line; and

as said liquid flows through said pressurized line, deflecting said liquid through a plurality of repeated directional changes within a generally straight portion of said line.

20. A method as recited in claim 19, wherein the deflecting step comprises alternatively deflecting said liquid in a clockwise and counterclockwise rotation as said liquid flows through said generally straight portion of said pressurized line.

21. A method as recited in claim 20, further comprising, as said liquid is flowing through said generally straight portion of said pressurized line,

dividing an undivided liquid stream into a first set of multiple streams and deflecting said first set of liquid streams in a first direction;

allowing said first set of multiple liquid streams to converge to form a combined liquid stream having a lower pressure than said undivided stream; then

dividing said combined liquid stream into a second set of multiple streams and deflecting said second set of liquid streams in a second direction; and

allowing said second set of liquid streams to reconverge to form a recombined liquid stream having a lower pressure than said combined liquid stream.

22. A method as recited in claim 21, wherein:

each of the dividing steps comprises directing a liquid stream over an edge of curved blade positioned within said liquid line,

each of the deflecting steps comprises directing a liquid stream over a toroidal major surface of said curved blade, and

each of the reconverging steps comprises directing divided liquid streams past a trailing edge of a curved blade and into contact with one another.

23. A method as recited in claim 22, wherein the dividing and converging steps comprise directing liquid past a first blade curved in a first direction and the redividing and reconverging steps comprise directing the liquid past a second curved blade curved in a second direction, said first and second blades being connected to one another in an end-to-end fashion, and a trailing edge of said second segment being positioned at an angle that is offset from an angle of a trailing edge of said first segment by 90 °.

24. A method as recited in claim 19, wherein liquid flows through a single passage during the pressure reduction operation.

25. A method as recited in claim 19, wherein liquid flows through multiple passages during the pressure reduction operation, said multiple passages having a common inlet and a common outlet, and a separate pressure reduction device being provided in each passage.